

Title: Implementing alcohol screening and brief interventions in primary health care: study protocol for a pilot cluster randomized controlled trial

Running head: Implementing alcohol screening and brief interventions

Article category – Study protocol

Frederico Rosário^{a,b,*}, Milica Vasiljevic^c, Leo Pas^d, Niamh Fitzgerald^e, Cristina Ribeiro^{b,f}

^a Tomaz Ribeiro Primary Health Care Center, Dão Lafões Primary Health Care Centers Grouping, Viseu, Portugal

^b Instituto de Medicina Preventiva e Saúde Pública, Faculdade de Medicina, Universidade de Lisboa, Lisboa, Portugal

^c Behaviour and Health Research Unit, University of Cambridge, Cambridge, UK

^d Academic Centre for General Practice, KU Leuven, Leuven, Belgium

^e Institute for Social Marketing, UK Centre for Tobacco and Alcohol Studies, University of Stirling, Stirling, UK

^f Division of Quality Management, Directorate-General of Health, Lisbon, Portugal

*Correspondence to Dr. F. Rosário, Instituto de Medicina Preventiva e Saúde Pública, Faculdade de Medicina, Universidade de Lisboa, Avenida Professor Egas Moniz 1649-028 Lisboa, Portugal. E-mail: fredmbr@gmail.com

KEY MESSAGES

- Alcohol brief interventions have been difficult to implement in practice
- Most implementation programmes have lacked a theoretical rationale
- This trial will assess the efficacy of a new theory-driven approach

Abstract

Background. Alcohol is one of the most important risk factors contributing to the global burden of disease. Screening and brief interventions in primary care settings are effective in reducing alcohol consumption. However, implementation of such interventions in routine practice has been proven difficult. Most programmes in practice and research have lacked a theoretical rationale for how they would change practitioner behaviour.

Objective. To determine whether a theory-based behaviour change intervention delivered to primary care practices significantly increases delivery of alcohol screening.

Methods. We will conduct a two-arm, cluster-randomized controlled, parallel, open trial. Twelve primary care practices will be randomized to one of two groups: training and support; and waiting-list control. Family physicians, nurses and receptionists will be eligible to participate. The intervention will be a training and support programme. The intervention will be tailored to the barriers and facilitators for implementing alcohol screening and brief interventions following the principles of the Behaviour Change Wheel approach. The primary outcome will be the proportion of patients screened with the Alcohol Use Disorders Identification Test.

Conclusion. This study will test whether a theory-driven implementation programme increases alcohol screening rates in primary care. Results from this trial will provide a useful addition to existing evidence by informing implementation researchers what areas of behaviour change are critical to increasing alcohol screening rates.

Trial registration: clinicaltrials.gov NCT02968186

Keywords: Alcohol-Induced Disorders, Screening, Counselling, Patient Education, Primary Health Care, Behavior Control

Introduction

Background and rationale

Worldwide, alcohol is one of the most important risk factors for mortality (1). Amongst 15-64 year olds in the European Union, 14% of deaths in men and 8% in women are estimated to be alcohol-related.

Screening and brief interventions (SBI) in primary health care (PHC) settings are a range of “psychosocial interventions designed to help recipients recognise harmful patterns of substance use, and to motivate and support them to address that use” (2) ranging from five to 30 minutes, traditionally delivered face to face, and have long been advocated for preventing harm from alcohol use. Several randomized controlled trials and meta-analysis have found alcohol SBI to be effective and cost-effective or cost-saving (3-5). Notwithstanding recent debates concerning this effectiveness evidence (6), it is clear that alcohol increases the risk of and/or exacerbates many conditions that present in primary care (7), and that addressing alcohol in PHC settings still makes sense (8). PHC professionals are well-positioned to advise at-risk drinkers (9) and they support the principle of delivery of alcohol SBI (10). However, the majority of them do not routinely deliver such interventions (11, 12) and few at-risk drinkers visiting PHC currently receive alcohol-related advice or intervention (11, 13, 14). They are therefore denied the opportunity to understand the risks and make an informed decision about whether or not to cut down.

Whilst alcohol SBI may work in controlled trials, researchers continue to grapple with the challenge of how to achieve effective implementation in routine practice. Several factors have been identified hindering or facilitating implementation. Lack of time, lack of training, and lack of screening and counselling tools are among the most commonly cited barriers whereas involving all relevant staff, financial incentives, and the intensity of the intervention effort (i.e. the amount of training and/or support provided) are commonly reported facilitators (9, 14-16).

Training and related initiatives have met with only modest success in securing widespread implementation of alcohol SBI (17) with the possible exception of a large, highly funded, high profile programme in Scotland (18). Most programmes in practice and research have lacked a theoretical rationale for how they would change practitioner behaviour (19-21). For instance, in the recently published ODHIN multi-centre trial (22), three implementation interventions (training and support, financial reimbursement, and internet-based counselling) were provided separately and in combination to

investigate their impact on the SBI activity. Only training and support was proven to have a lasting, albeit small, effect on the SBI activity at 9 months of follow-up. However, the intervention components were not theory-driven which might have had a negative effect on the efficacy of the training and support package. Several other implementation programmes suffered from the same conceptual flaws (23-25). The intervention in our trial will differ from previous, more empirically-derived, strategies in that the intervention components (behaviour change techniques) were selected after a thorough analysis and mapping of the barriers and facilitators to implementation to their respective theoretical constructs. As such, the depth of the approach to intervention design will be greater in this study than has previously been the case.

By identifying theoretical concepts underpinning the barriers and facilitators to implementation, researchers can select intervention techniques that are predicted to lead to behaviour change (19, 26-28). One theory-driven intervention study is being tested by Abidi *et al.* (29) aiming to increase general practitioners' alcohol SBI delivery. In this study, general practitioners are invited to visit a website where they can access an e-learning module and receive tailored feedback and support. Our intervention will also differ substantially from the one reported by Abidi *et al.* (29) (see Supplementary Material S1 for a detailed description of the intervention). We will deliver a theory-based, face-to-face training and ongoing support intervention to all primary care staff. Involving all staff in the implementation efforts has been identified as an important facilitator for implementing alcohol SBI in PHC (30-33). Another example of an implementation facilitator we will use is to promote the exchange of positive experiences with peers (34, 35). Finally, by delivering face-to-face training, we will be able to use role-play for tackling several implementation barriers, such as lack of training and confidence in skills to deliver SBI.

The Context of the Trial

The trial will be conducted in the Dão Lafões Grouping of PHC in Portugal. Alcohol is the most commonly consumed addictive substance in Portugal, with 20% to 30% of over 18 year olds drinking at a hazardous level or higher (36). Patients at the Dão Lafões Grouping of PHC Centres have a mortality rate due to liver cirrhosis that is 48% higher than the national average (37). Under normal circumstances, professionals at these PHC centres would not receive any intervention focused on their practice relating to

alcohol, over and above a normative expectation that they keep track of all national guidelines published by the National Health Directorate, which include guidelines on alcohol interventions (38).

Objective

The objective of this pilot trial is to determine whether a theory-based behaviour change intervention delivered to PHC practices significantly increases delivery of alcohol screening in those practices compared to delivery in practices assigned to a waiting list (treatment as usual) condition.

Trial design

We will conduct a cluster-randomized, waiting-list controlled, open trial, with two parallel groups, with a 1:1 allocation ratio. The unit of randomization will be the PHC practice. The study will pilot test the efficacy of a new programme tailored to the barriers and facilitators for implementing alcohol SBI.

Methods

This protocol was written in accordance with the Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) statement (39).

Study setting

The trial setting will be community-based PHC in Portugal. The Dão Lafões Grouping of PHC Centres comprises 26 PHC units, funded by the National Health Service. Each PHC unit is comprised of family physicians (FP), nurses, and receptionists. Each FP works preferably with the same nurse and receptionist, providing care to a list of patients (1600 to 1900 patients on average). Since 2005, PHC units in Portugal can be categorized into one of two models: the 'Personalized Health Care Units' (traditional PHC practices), in which professionals receive a fixed salary; and the 'Family Health Units', in which professionals work together to provide a more personal and flexible approach to the care of patients.

Professionals at level-A Family Health Units still receive a fixed salary but if they achieve the quality indicators targets, they are upgraded to level-B units. Monthly income for professionals working in a level-B Family Health Unit depends on the base salary, patient list size, and pay for performance.

Eligibility criteria

All PHC units will be eligible to participate. PHC units will be excluded if they have less than five patient lists, or if they have a specific alcohol programme implemented in their practice but will be offered the programme after the end of the trial. All PHC professionals willing to participate will be enrolled.

Interventions

The intervention will be a package of training and support for PHC professionals. Prior to intervention design, we identified the barriers and facilitators to the implementation of alcohol SBI in PHC using three consecutive approaches. Firstly, we analysed a subset of qualitative data on barriers and facilitators identified in the BISTAIRS (Brief interventions in the treatment of alcohol use disorders in relevant settings) project. This was a European Union co-funded project in which two PHC units from the Dão Lafões Grouping of PHC Centres participated. Barriers and facilitators identified in this project (35) were mapped and included in the programme. Secondly, we analysed a subset of survey data on barriers and facilitators identified by the ODHIN (Optimizing delivery of health care interventions) project. This was also a European Union co-funded project in which a representative sample of 234 Portuguese FPs participated. Barriers and facilitators identified (40) by these FPs were also taken account of in the programme. With this approach, we aimed to identify the most important barriers and facilitators to alcohol SBI implementation that are both locally and nationally significant. Finally, the programme was informed by the results of a systematic review of the literature (41, 42). The barriers and facilitators identified using the three approaches above were collated and analysed with the Behaviour Change Wheel (BCW)/Theoretical Domains Framework (TDF). The BCW emerged recently as a comprehensive framework for designing interventions (27). The framework consists of three layers. At the core of the wheel (inner layer) there is a model of behaviour change designated as COM-B ('Capability', 'Opportunity', 'Motivation' and 'Behaviour'). The intermediate layer identifies nine intervention

functions which are broader categories of means by which an intervention can change behaviour. The rim of the wheel comprises seven policy categories which represent the decisions authorities can use to support interventions. The COM-B model can be further expanded by the TDF (43). The TDF was derived from an analysis of 33 theories of behaviour change and comprises 14 domains consisting of 84 component constructs of behaviour change. A Behaviour Change Technique (BCT) taxonomy has been developed to standardize the reporting of intervention content (26). BCTs are the smallest components of an intervention with the potential to change behaviour (44). The BCT taxonomy was used as the final step for designing the intervention. Finally, the selected behaviour change techniques were operationalized and integrated into a comprehensive implementation programme.

The implementation period will last for one year. Health professionals in the intervention arm will receive four training sessions (total of 30 hours) in the first 12 weeks of the implementation period. Training will be mainly delivered by FR, a local FP champion and certified trainer by the Portuguese Institute for Employment and Vocational Training, with experience in delivering training on alcohol SBI (see Supplementary Material S2–S5 for a detailed description of the training programme):

- Session 1 - participants will become familiar with the evidence concerning alcohol-related harm, and with the evidence for delivering alcohol SBI. Next, the notions of standard drink, risk continuum, daily drinking limits, and binge drinking will be presented. Participants will be told how to screen using the Alcohol Use Disorders Identification Test (AUDIT), and how to provide simple advice to patients with a positive screening. Barriers and facilitators for delivering alcohol SBI will be presented and discussed. Participants will be encouraged to adopt a working team model at their practices;
- Session 2 - participants will be asked to share experiences concerning implementation efforts in their practices. Next, participants will be introduced to the core concepts of brief intervention with a particular focus in the use of the OARS (Open-ended questions, Affirmations, Reflections, Summaries) skills. The transtheoretical model of behaviour change will be presented as a tool for determining patients' readiness to change;
- Session 3 - participants will be guided on how to tailor their actions to the stage of change the patient is at. This will be achieved through both group and individual exercises. Two specialists

on alcohol dependence from a local recovery service will be talking about alcohol dependence and discussing clinical scenarios with the participants;

- Session 4 - participants will be asked to practice brief interventions.

Additional support will be continuously available to practices by means of a dedicated team that will help participants who have difficulties in implementing the project (see Supplementary Material S1 for a detailed description of the supporting actions). Posters specifically designed for this project will be made available to the PHC units which aim to help professionals to elicit alcohol issues during the consultations, and to help professionals to remember to conduct alcohol SBI. Patient leaflets were also specifically produced for this project, aiming to aid professionals in advising at-risk drinkers to cut down.

Participants in the control arm will be assigned to a waiting list. They will be provided with the Portuguese guideline for conducting alcohol SBI and the materials for the collection of research data, without demonstration. Participants in the waiting list will receive the program after a waiting period of one year.

Assessments

Doctors and nurses will be asked to fill in a questionnaire before randomization takes place. They will also be asked to fill in the same questionnaire at the end of the trial. The questionnaire aims to measure three distinct areas: attitudes to working with at-risk drinkers; barriers to implementing alcohol SBI and; knowledge about basic notions related to alcohol SBI.

Attitudes to working with at-risk drinkers: will be measured with the Short Alcohol and Alcohol Problems Perception Questionnaire (SAAPPQ), a validated scale based on factor analysis (36, 45). The SAAPPQ measures the level of agreement with ten statements on a seven-point Likert scale, from 1-strongly disagree to 7-strongly agree. Each pair of items measures a distinct dimension – Adequacy, Legitimacy, Motivation, Satisfaction and Self-Esteem;

Barriers for implementing alcohol SBI: will be assessed with an adapted version of an existing questionnaire (46). Participants will be asked to express their level of agreement with 33 statements on a seven-point Likert scale, from 1-strongly disagree to 7-strongly agree. Each statement can be mapped to a

specific domain of the TDF. This will allow us to measure the impact of the implementation programme in each TDF domain;

Knowledge: will be evaluated by each participant's responses to four multiple choice questions. These questions will measure the theoretical knowledge to key concepts related to alcohol SBI, more specifically the definition of standard drink, the definition of low risk drinking levels, and the AUDIT cut-off scores.

The questionnaire to be completed at the end of the trial will be the same, except for an additional section comprising seven questions. This section will be filled in only by participants in the intervention arm. Participants will be asked to rate the impact of the materials that were specifically produced for the study. Each statement will be measured on a seven-point Likert scale, from 1-strongly disagree to 7-strongly agree.

Primary outcome measure

Screening rate: professionals will be asked to screen patients who are 18 years old or older with at least one appointment during the 12-month implementation period excluding any duplicates. Patients will be screened based on the Portuguese guideline (38). At-risk drinkers are defined as patients scoring ≥ 8 on the AUDIT. Screening rates will be measured using paper tally sheets. Tally sheets will include the AUDIT, a table to indicate the action(s) taken for at-risk patients, participant's name, and a field to input patients' medical record number. The screening rate will be computed by dividing the number of completed screens by the total number of eligible patients, multiplied by 100.

Secondary outcome measures

Brief intervention rate: participants will be asked to deliver a brief intervention to at-risk drinkers. The brief intervention rate will be computed by dividing the number of brief interventions delivered by the total number of at-risk patients multiplied by 100.

Percentage of family physicians in the group with more positive attitudes: participants will be asked to fill in the SAAPPQ at baseline (T0), and at the end of the trial (T1). The answers will be used to determine in which group a FP is classified by applying the equation

$$P = 1/(1+\exp^{(-(-26.9732+0.9467*\text{Adequacy}+1.0552*\text{Self-Esteem}+1.0053*\text{Motivation})))}$$

that was previously validated (47). This classification model will be used to quantify, in each measurement period T, the percentage of FPs with more positive attitudes in the intervention and control groups.

Changes in barriers to implementing alcohol screening and brief intervention: will be ascertained with the answers to the barriers section of the questionnaire, and will be expressed by the average score in each domain of the TDF.

Level of knowledge: will be expressed by the percentage of correct answers on the third section of the questionnaire.

Usefulness of the materials: will be expressed by the average score on each of the relevant questions answered by the intervention group at the end of the trial.

Participant timeline, recruitment, allocation and blinding

The study flowchart is outlined in Figure 1. Firstly, a joint meeting will be scheduled with the coordinators of all 26 PHC units. The research team will present the protocol to the coordinators, and invite them to participate. During this meeting, 12 PHC units from those agreeing to participate will be randomly selected by ballot without replacement, stratified by type of organization. Secondly, individual meetings with each one of the 12 PHC units selected will be scheduled to present the project and invite all PHC professionals to participate. To take part in the trial, professionals will be required to sign a consent form. During this meeting, and prior to randomization into one of the trial arms, doctors and nurses will be asked to complete a questionnaire to measure knowledge, attitudes and barriers to implementing alcohol SBI. This approach will ensure that participants' answers will not be influenced by previously knowing whether they will receive the intervention or integrate a waiting-list. Finally, participants will be

randomized at the PHC level by ballot without replacement, stratified by type of organization, into the intervention arm or the waiting list control arm.

Due to the nature of the study design, neither the research team nor the participants will be blinded to the allocation of the PHC units.

Sample size

The sample size was calculated on the basis of the primary hypothesis. Assuming a screening rate of 50% in the intervention arm, and 10% in the control group, power of 80%, alpha of 5%, intraclass correlation coefficient of 0.05, and a minimum of five patient lists per cluster, each arm will need to include five PHC units. The intervention rate estimation was based on the results of a meta-analysis (17). The control rate was based on the estimated annual screening rate at the Dão Lafões Grouping of PHC. To avoid loss of power due to loss to follow-up, six units will be included in each arm of the trial.

Data collection, management and monitoring

Data will be independently inputted into an Excel database by two members of the research team. Databases will be compared and checked for inconsistencies and errors. All data will be stored for a minimum period of 5 years in a lockable cabinet accessible only to the research team. No data monitoring committee will be established as no significant risks are anticipated to the participants in this study.

Statistical methods

Data will be described as frequency distributions, central tendency measures and dispersion measures as appropriate. Computations will be conducted as intention-to-treat analysis. Comparison of qualitative measurements will be performed with Pearson χ^2 test or McNemar test, as appropriate; comparison of quantitative variables will be conducted with Student's t-test for independent and related samples, as appropriate. Due to the cluster design of the trial, multilevel regression modelling will be

conducted to assess the association of independent variables with the screening and brief intervention rates. A p-value <0.05 will be considered statistically significant.

Ethics and dissemination

The study protocol received approval from the Ethics Committee of the Faculty of Medicine of Lisbon (Ref. 359/19) and by the Ethics Committee of the Centre Regional Health Authority (Ref. 77/2016). Trial results will be presented to the participants in the study. The results will also be presented at scientific events and published in a scientific journal.

Discussion

For several decades now, researchers have tried to implement alcohol SBI programmes but evidence is still lacking regarding the optimal characteristics of training and support for alcohol screening and brief intervention delivery (48). Most studies reporting on training and support programmes present ill-defined descriptions, and considerable variation in terms of duration and intensity, contributing to the heterogeneity found in published trials (48). Most of these studies also lack a theoretical background underpinning the design of training and support.

To bridge this gap in the evidence base, this study aims to evaluate whether a theory-based implementation programme increases alcohol screening delivery by Portuguese primary health care practices. The implementation programme to be applied was tailored to the barriers and facilitators identified in the literature, underpinned by the BCW/TDF framework of behaviour change. Alcohol screening and brief intervention are underdelivered to the target population (13, 49, 50); we hypothesise that this programme will help to increase the delivery of screening (and related interventions) in primary health care. This in turn may help to ease the burden of disease attributable to alcohol. Results from this trial will provide a useful addition to existing evidence by informing implementation researchers about what areas of behaviour change are critical to increasing alcohol screening rates.

Conceptual flaws in the design of interventions might help to explain the modest increases in alcohol SBI activity achieved. Failure to implement alcohol SBI is leading researchers to think about scaling-up

interventions to the system-level. One important quasi-experimental study is underway to test whether or not providing community and municipal support leads to higher alcohol SBI activity in PHC (51). This current line of thinking does not negate the value of exploring untested, less expensive approaches such as in this trial.

Acknowledgements

NF is employed by the Institute for Social Marketing, which is part of the UK Centre for Tobacco and Alcohol Studies (<http://www.ukctas.net>). Funding for UKCTAS from the British Heart Foundation, Cancer Research UK, the Economic and Social Research Council, the Medical Research Council and the National Institute of Health Research, under the auspices of the UK Clinical Research Collaboration, is gratefully acknowledged.

Funding

The Dão Lafões Grouping of Primary Health Care Centres have provided the funding for the materials required for implementing the study. There are no other funding sources.

Conflict of interest

None.

References

1. LIM S. S., VOS T., FLAXMAN A. D., DANAEI G., SHIBUYA K., ADAIR-ROHANI H. et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010, *Lancet* 2012; 380: 2224-2260.
2. European Monitoring Centre for Drugs and Drug Addiction. Emergency department-based brief interventions for individuals with substance-related problems: a review of effectiveness. EMCDDA Papers, Publications Office of the European Union, Luxembourg, 2016.
3. ANGUS C., THOMAS C., ANDERSON P., MEIER P. S., BRENNAN A. Estimating the cost-effectiveness of brief interventions for heavy drinking in primary health care across Europe, *European journal of public health* 2017; 27: 345-351.
4. CUIJPERS P., RIPER H., LEMMERS L. The effects on mortality of brief interventions for problem drinking: a meta-analysis, *Addiction* 2004; 99: 839-845.
5. KANER E. F., BEYER F. R., MUIRHEAD C., CAMPBELL F., PIENAAR E. D., BERTHOLET N. et al. Effectiveness of brief alcohol interventions in primary care populations, *Cochrane Database Syst Rev* 2018; 2: CD004148.
6. MCCAMBRIDGE J., SAITZ R. Rethinking brief interventions for alcohol in general practice, *BMJ* 2017; 356: j116.
7. REHM J., GMEL G., PROBST C., SHIELD K. D. Lifetime-risk of alcohol-attributable mortality based on different levels of alcohol consumption in seven European countries. Implications for low-risk drinking guidelines. Toronto, On, Canada: Centre for Addiction and Mental Health. 2015. https://www.camh.ca/en/research/news_and_publications/reports_and_books/Documents/Lifetime%20Risk%20of%20Alcohol-Attributable%20Mortality.pdf. Accessed 22 March 2017.
8. ANDREASSON S. B. Tackling alcohol use: screening, target group, and patient centred care, *BMJ* 2017; 356: j1119.
9. O'DONNELL A., ANDERSON P., NEWBURY-BIRCH D., SCHULTE B., SCHMIDT C., REIMER J. et al. The impact of brief alcohol interventions in primary healthcare: a systematic review of reviews, *Alcohol Alcohol* 2014; 49: 66-78.
10. MCAVOY B., DONOVAN R., JALLEH G., SAUNDERS J., WUTZKE S., LEE N. et al. General Practitioners, Prevention and Alcohol - a powerful cocktail? Facilitators and inhibitors of practising preventive medicine in general and early intervention for alcohol in particular: a 12-nation key informant and general practitioner study, *Drugs: education, prevention and policy* 2001; 8: 103-117.
11. CHEETA S., DRUMMOND C., OYEFESO A., PHILLIPS T., DELUCA P., PERRYMAN K. et al. Low identification of alcohol use disorders in general practice in England, *Addiction* 2008; 103: 766-773.
12. GEIRSSON M., BENDTSEN P., SPAK F. Attitudes of Swedish general practitioners and nurses to working with lifestyle change, with special reference to alcohol consumption, *Alcohol Alcohol* 2005; 40: 388-393.
13. BROWN J., WEST R., ANGUS C., BEARD E., BRENNAN A., DRUMMOND C. et al. Comparison of brief interventions in primary care on smoking and excessive alcohol consumption: a population survey in England, *Br J Gen Pract* 2016; 66: e1-9.
14. WILSON G. B., LOCK C. A., HEATHER N., CASSIDY P., CHRISTIE M. M., KANER E. F. Intervention against excessive alcohol consumption in primary health care: a survey of GPs' attitudes and practices in England 10 years on, *Alcohol Alcohol* 2011; 46: 570-577.

15. JOHNSON M., JACKSON R., GUILLAUME L., MEIER P., GOYDER E. Barriers and facilitators to implementing screening and brief intervention for alcohol misuse: a systematic review of qualitative evidence, *J Public Health (Oxf)* 2010: 33: 412-421.
16. NILSEN P., AALTO M., BENDTSEN P., SEPPA K. Effectiveness of strategies to implement brief alcohol intervention in primary healthcare. A systematic review, *Scand J Prim Health Care* 2006: 24: 5-15.
17. ANDERSON P., LAURANT M., KANER E., WENSING M., GROL R. Engaging general practitioners in the management of hazardous and harmful alcohol consumption: results of a meta-analysis, *J Stud Alcohol* 2004: 65: 191-199.
18. Information Services Division Scotland. Alcohol Brief Interventions 2015/16. 2016. <http://www.isdscotland.org/Health-Topics/Drugs-and-Alcohol-Misuse/Publications/2016-06-14/2016-06-14-ABI2015-16-Report.pdf>. Accessed 21/11/2017.
19. MICHIE S., PRESTWICH A. Are interventions theory-based? Development of a theory coding scheme, *Health psychology : official journal of the Division of Health Psychology, American Psychological Association* 2010: 29: 1-8.
20. BREHAUT J. C., EVA K. W. Building theories of knowledge translation interventions: use the entire menu of constructs, *Implement Sci* 2012: 7: 114.
21. DAVIES P., WALKER A. E., GRIMSHAW J. M. A systematic review of the use of theory in the design of guideline dissemination and implementation strategies and interpretation of the results of rigorous evaluations, *Implement Sci* 2010: 5: 14.
22. ANDERSON P., COULTON S., KANER E., BENDTSEN P., KLODA K., REYNOLDS J. et al. Delivery of Brief Interventions for Heavy Drinking in Primary Care: Outcomes of the ODHIN 5-Country Cluster Randomized Trial, *Annals of family medicine* 2017: 15: 335-340.
23. VAN BEURDEN I., ANDERSON P., AKKERMANS R. P., GROL R. P., WENSING M., LAURANT M. G. Involvement of general practitioners in managing alcohol problems: a randomized controlled trial of a tailored improvement programme, *Addiction* 2012: 107: 1601-1611.
24. LOCKYER J., EL-GUEBALY N., SIMPSON E., GROMOFF B., TOEWS J., JUSCHKA B. Standardized patients as a measure of change in the ability of family physicians to detect and manage alcohol abuse, *Academic medicine : journal of the Association of American Medical Colleges* 1996: 71: S1-3.
25. HILBINK M., VOERMAN G., VAN BEURDEN I., PENNING B., LAURANT M. A randomized controlled trial of a tailored primary care program to reverse excessive alcohol consumption, *J Am Board Fam Med* 2012: 25: 712-722.
26. CANE J., RICHARDSON M., JOHNSTON M., LADHA R., MICHIE S. From lists of behaviour change techniques (BCTs) to structured hierarchies: comparison of two methods of developing a hierarchy of BCTs, *Br J Health Psychol* 2015: 20: 130-150.
27. MICHIE S., VAN STRALEN M. M., WEST R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions, *Implement Sci* 2011: 6: 42.
28. GARDNER B., WHITTINGTON C., MCATEER J., ECCLES M. P., MICHIE S. Using theory to synthesise evidence from behaviour change interventions: the example of audit and feedback, *Soc Sci Med* 2010: 70: 1618-1625.
29. ABIDI L., OENEMA A., CANDEL M. J., VAN DE MHEEN D. A theory-based implementation program for alcohol screening and brief intervention (ASBI) in general practices: Planned development and study protocol of a cluster randomised controlled trial, *Contemporary clinical trials* 2016: 51: 78-87.
30. CARLFJORD S., LINDBERG M., ANDERSSON A. Staff perceptions of addressing lifestyle in primary health care: a qualitative evaluation 2 years after the introduction of a lifestyle intervention tool, *BMC Fam Pract* 2012: 13: 99.

31. HOLMQVIST M., BENDTSEN P., SPAK F., ROMMELSJO A., GEIRSSON M., NILSEN P. Asking patients about their drinking. A national survey among primary health care physicians and nurses in Sweden, *Addict Behav* 2008; 33: 301-314.
32. MULES T., TAYLOR J., PRICE R., WALKER L., SINGH B., NEWSAM P. et al. Addressing patient alcohol use: a view from general practice, *Journal of primary health care* 2012; 4: 217-222.
33. NYGAARD P., AASLAND O. G. Barriers to implementing screening and brief interventions in general practice: findings from a qualitative study in Norway, *Alcohol Alcohol* 2011; 46: 52-60.
34. ABIDI L., OENEMA A., NILSEN P., ANDERSON P., VAN DE MHEEN D. Strategies to Overcome Barriers to Implementation of Alcohol Screening and Brief Intervention in General Practice: a Delphi Study Among Healthcare Professionals and Addiction Prevention Experts, *Prevention science : the official journal of the Society for Prevention Research* 2016; 17: 689-699.
35. RIBEIRO C., ROSÁRIO F. Managing risky drinking in primary health care setting. Field test strategy, Portugal. 2014. http://www.bistairs.eu/material/WP6_material/Portugal_PHC.pdf (24 March 2017, date last accessed).
36. RIBEIRO C. [Family medicine approach to alcohol consumption: detection and brief interventions in primary health care], *Acta Med Port* 2011; 24 Suppl 2: 355-368.
37. ARS Centro. Evolução da Taxa de Mortalidade Padronizada (/100000 habitantes) nos triénios 2010-2012, 2011-2013, e 2012-2014 (média anual), na população com idade inferior a 75 anos e ambos os sexos., http://www.arscentro.min-saude.pt/microsites/psaude2016/PLS2016_A28.htm; 2016.
38. Norma nº 30/2012 de 28 de Dezembro, Atualização 18/12/2014. Direção-Geral da Saúde. Lisboa. Available at: <https://www.dgs.pt/normas-clinicas/normas-clinicas.aspx>.
39. CHAN A. W., TETZLAFF J. M., GOTZSCHE P. C., ALTMAN D. G., MANN H., BERLIN J. A. et al. SPIRIT 2013 explanation and elaboration: guidance for protocols of clinical trials, *BMJ* 2013; 346: e7586.
40. ROSARIO F., WOJNAR M., RIBEIRO C. Differences between Groups of Family Physicians with Different Attitudes towards At-Risk Drinkers: A Post Hoc Study of the ODHIN Survey in Portugal, *International journal of family medicine* 2016; 2016: 3635907.
41. ROSÁRIO F., SANTOS M., ANGUS K., PAS L., RIBEIRO C., FITZGERALD N. Factors Influencing the Implementation of Screening and Brief Interventions for Alcohol Use in Primary Care Practices: A Systematic Review Protocol, *Acta Med Port* 2018; 31: 45-50, Erratum-ibid 2018;2031(2012):2139.
42. ROSÁRIO F., SANTOS M., ANGUS K., PAS L., RIBEIRO C., FITZGERALD N. Factors influencing the implementation of early identification and brief interventions for alcohol use in primary health care practices: a systematic review, Manuscript in preparation.
43. CANE J., O'CONNOR D., MICHIE S. Validation of the theoretical domains framework for use in behaviour change and implementation research, *Implement Sci* 2012; 7: 37.
44. STEINMO S., FULLER C., STONE S. P., MICHIE S. Characterising an implementation intervention in terms of behaviour change techniques and theory: the 'Sepsis Six' clinical care bundle, *Implement Sci* 2015; 10: 111.
45. ANDERSON P., CLEMENT S. The AAPPQ revisited: the measurement of general practitioners' attitudes to alcohol problems, *Br J Addict* 1987; 82: 753-759.
46. HUIJG J. M., GEBHARDT W. A., CRONE M. R., DUSSELDORP E., PRESSEAU J. Discriminant content validity of a theoretical domains framework questionnaire for use in implementation research, *Implement Sci* 2014; 9: 11.
47. ROSARIO F., WOJNAR M., RIBEIRO C. Can Doctors Be Divided Into Groups Based on Their Attitudes to Addressing Alcohol Issues in Their Patients? Analyses From a Survey of Portuguese General Practitioners, *Subst Use Misuse* 2017; 52: 233-239.

48. FITZGERALD N., ANGUS K., BAULD L. Reported training in alcohol brief intervention trials: a systematic narrative synthesis, *Addiction science & clinical practice* 2016: 11: A28.
49. MAKELA P., HAVIO M., SEPPA K. Alcohol-related discussions in health care--a population view, *Addiction* 2011: 106: 1239-1248.
50. SEBO P., MAISONNEUVE H., CERUTTI B., FOURNIER J. P., SENN N., RAT C. et al. Overview of preventive practices provided by primary care physicians: A cross-sectional study in Switzerland and France, *PloS one* 2017: 12: e0184032.
51. ANDERSON P., O'DONNELL A., KANER E., GUAL A., SCHULTE B., PEREZ GOMEZ A. et al. Scaling-up primary health care-based prevention and management of heavy drinking at the municipal level in middle-income countries in Latin America: Background and protocol for a three-country quasi-experimental study, *F1000Research* 2017: 6: 311.

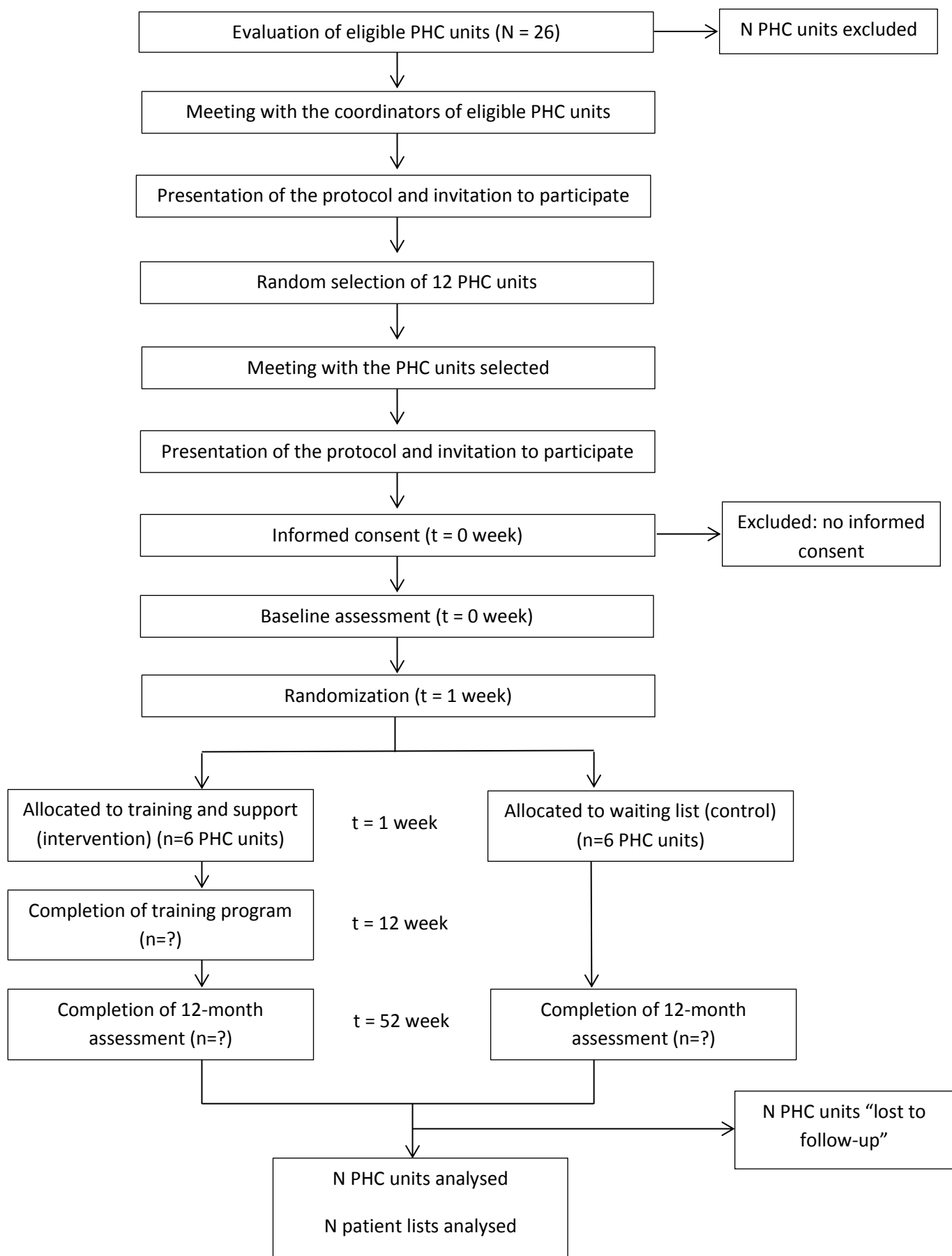


Figure 1: Study flowchart

Supplementary Material S1. Description of the implementation programme: theoretical concepts underpinning the barriers to implementation and operationalization of the selected behaviour change techniques

						CAPABILITY					OPPORTUNITY		MOTIVATION								
						Physical	Psychological				Social	Physical	Reflective							Automatic	
Barriers	Constructs	No.	Label	Intervention Content	Functions	S	K	S	MAD	BR	SI	EN	B Cap	B Cons	S/P ID	O	G	I	Reinf	EM	
Professionals think they screen frequently about alcohol	Unrealistic optimism	6.2	Social comparison	Evidence that ASBI rates are low and discussion about implementation in the participants' workplace	Education, Persuasion																
		13.3	Incompatible beliefs	Draw attention to the fact that having low ASBI rates means not practicing evidence-based medicine																	
Reliance on clinical suspicion and/or blood tests to diagnose alcohol misuse	Procedural knowledge	5.1	Information about health consequences	Explain that clinical suspicion and/or blood tests have low sensitivity for detecting alcohol misuse	Education																
Preventive health should be patients' responsibility	Professional role	6.2	Social comparison	Group discussion so that participants who think prevention should be patients' responsibility are confronted with their peers who disagree on this point of view	Education, Persuasion																
		6.3	Information about others' approval	Evidence that both professionals approve a systematic approach to alcohol problems																	
		13.3	Incompatible beliefs	Draw attention to the fact that one of the most important roles of primary care professionals is to deliver preventive health activities, and that this is not being offered routinely concerning alcohol																	
Alcohol SBI are not effective / patients will not follow the advice to cutdown	Pessimism	15.1	Verbal persuasion about capability	Tell the participants that this belief is related to experiences with patients with alcohol dependency and that they will surely feel more patient compliance if BIs are applied to hazardous and harmful drinkers	Education, Persuasion																
	Beliefs	5.1	Information about health consequences	Present successfull examples drom clinical practice																	
		5.3	Information about social and environmental consequences	Evidence for the efficacy of of BIs for hazardous and harmful drinking																	
Lack of incentives	Rewards	10.4	Social reward	Periodically inform participants about the SBI rates in each PHC unit and congratulate those that show improvements	Incentivisation, Persuasion																
	Incentives	2.2	Feedback on behaviour																		
		6.2	Social comparison																		
Lack of support services	Resources / material resources	3.1	Social support (unspecified)	Inform about the existence of a team that gives support to the implementation of the project and how this team can be reached; Involve an addiction specialist from a reference center in one of the training modules	Enablement																
Lack of time	Beliefs	9.2	Pros and cons	Ask participants to register the two main benefits for patients and for professionals, and the two main barriers for implementing ASBI; promote a group discussion around their answers, enlightening the benefits and use evidence for arguing against the barriers	Education, Persuasion																
		16.2	Imaginary reward	After showing evidence that patients with higher alcohol consumption have more frequent appointments, ask participants to imagine delivering ASBI followed by the patient decreasing the number of appointments																	
		Environmental stressors	12.2	Restructuring the social environment	Advise to minimize time spent performing ASBI by adopting a teamwork model: the receptionist gives the AUDIT to the patient; the patient fills in the AUDIT while waiting for the appointment; if positive, BI can be delivered by the family physician or by the family nurse																Enablement, Environmental restructuring

		Behaviour Change Techniques				CAPABILITY					OPPORTUNITY		MOTIVATION									
						Physical	Psychological				Social	Physical	Reflective							Automatic		
Barriers	Constructs	No.	Label	Intervention Content	Functions	S	K	S	MAD	BR	SI	EN	B Cap	B Cons	S/P ID	O	G	I	Reinf	EM		
		12.5	Adding objects to the environment	Provide participants with the AUDIT questionnaire																		
	Perceived behavioural control	15.1	Verbal persuasion about capability	Show that it is possible to integrate ASBI into the daily routine despite the limited consultation time, arguing that actually saves time in the future because reducing alcohol consumption is associated with less consultations per at-risk drinker	Persuasion																	
Lack of knowledge and/or training	Knowledge	5.1	Information about health consequences	Evidence for the efficacy of of BIs for hazardous and harmful drinking in reducing physical, mental and social problems. Provide theoretical background: epidemiology, definition of standard drink and at-risk drinking, examples of alcohol-related problems, AUDIT questionnaire, guideline on alcohol	Education, Persuasion																	
		5.3	Information about social and environmental consequences																			
	Procedural knowledge	4.1	Instruction on how to perform a behaviour	Participants observed and participated in ASBI training simulations of increasing difficulty. Prompt participants to practice ASBI at the workplace	Education, Modelling, Training																	
		6.1	Demonstration of the behaviour																			
		8.1	Behaviour practice/rehearsal																			
		8.3	Habit formation																			
		8.7	Graded tasks																			
	Ability Competence Interpersonal skills Practice Skill assessment Skills Skills development	4.1	Instruction on how to perform a behaviour	Participants observed and participated in ASBI training simulations of increasing difficulty. Training simulations include the following topics: how to initiate screening; giving feedback to the patient and advising to cutdown; starting the conversation about alcohol; determining the stage of change; applying motivational interview techniques; negotiating goals; arranging for follow-up; re-evaluating the patient at follow-up. Prompt participants to practice ASBI at their workplaces	Education, Modelling, Training																	
		6.1	Demonstration of the behaviour																			
		8.1	Behaviour practice / rehearsal																			
		8.3	Habit formation																			
		8.7	Graded tasks																			
	Self-confidence Perceived competence Perceived behavioural control Professional confidence	15.1	Verbal persuasion about capability	Discussion on ease of implementation	Persuasion																	
		15.3	Focus on past success	Discussion on successful cases of implementation																		
	Lack of motivation/willingness to engage with drinkers	Knowledge of task environment	6.3	Information about others' approval	Evidence that both professionals approve a systematic approach to alcohol problems																Persuasion	
Stages of change model		9.2	Pros and cons	Ask participants to register the two main benefits for patients and for professionals, and the two main barriers for implementing ASBI; promote a group discussion around their answers, enlightening the benefits and use evidence for arguing against the barriers	Persuasion																	
Stability of intentions		2.2	Feedback on behaviour	Periodically inform participants about the SBI rates in each	Incentivisation, Persuasion																	
	6.2	Social comparisons	PHC unit and congratulate those that																			
		10.4	Social reward	show improvements																		
Patients' misbeliefs about alcohol	Professional confidence Self-confidence Perceived behavioural control	15.1	Verbal persuasion about capability	Discussion on the ease of how to inform patients about their misbeliefs about alcohol	Persuasion																	
Lack of structured action protocol	Professional boundaries	4.1	Instruction on how to perform a behaviour	Instruction on how to implement ASBI using a teamwork model involving doctors, nurses and receptionists. Provide participants with a resource providing written instructions, the AUDIT questionnaire, patient handouts, and posters to display throughout PHC premisses	Education, Modelling, Environmental restructuring																	
	Resources/material resources Barriers and facilitators	4.1	Instruction on how to perform a behaviour																			
		12.5	Adding objects to the environment																			
			1.2	Problem solving	Ask each PHC team to adapt the protocol to their needs, by identifying factors hindering implementation and to come																	

Supplementary Material S1 (cont.). Description of the implementation programme: theoretical concepts underpinning the barriers to implementation and operationalization of the selected behaviour change techniques

						CAPABILITY					OPPORTUNITY		MOTIVATION								
						Physical	Psychological				Social	Physical	Reflective							Automatic	
Barriers	Constructs	No.	Label	Intervention Content	Functions	S	K	S	MAD	BR	SI	EN	B Cap	B Cons	S/P ID	O	G	I	Reinf	EM	
	Action planning	1.4	Action planning	up with solutions for overcoming them. Prompt participants to start implementing ASBI systematically	Enablement																
Patients do not want / would resent being asked about their alcohol consumption	Knowledge of task environment	6.3	Information about others' approval	Evidence that patients approve a systematic approach to alcohol problems	Persuasion																
	Beliefs	4.4	Behavioural experiments	Prompt participants to practice ASBI at their workplaces and to note patients' reactions	Education, Enablement, Persuasion																
		5.3	Information about social and environmental consequences	Evidence that patients do not get upset when asked about alcohol use and are willing to answer the AUDIT questions																	
Patients lie about alcohol use	Beliefs	15.1	Verbal persuasion about capability	Teel participants that they can successfully identify patients with alcohol misuse by providing evidence that the AUDIT questionnaire is able to detect excessive alcohol use even when patients underreport their drinking	Persuasion																
Professionals' frustration and sense of low self-efficacy with unsuccessful attempts to counsel patients to cutdown	Positive / Negative affect Self-confidence Self-efficacy Professional confidence Pessimism	4.1	Instruction on how to perform a behaviour	Discussion of what is considered a "success" and what participants consider a typical patient with alcohol problems. Evidence that ASBI is for hazardous and harmful drinking patients and that they will surely feel successful with these patients. Prompt participants to describe occasions on which they felt success. Participants observed and participated in ASBI training simulations. Prompt participants to practice ASBI at their workplaces.	Education, Modeling, Persuasion, Training																
		5.6	Information about emotional consequences																		
		6.1	Demonstration of the behaviour																		
		8.1	Behaviour practice/rehearsal																		
		8.3	Habit formation																		
		15.1	Verbal persuasion about capability																		
		15.3	Focus on past success																		
	Outcome expectancies Consequents	5.1	Information about health consequences	Discussion on the severity of alcohol-related problems on the region participants are working. Evidence for the efficacy of of BIs for hazardous and harmful drinking and what is expected from PHC professionals. Ask participants to imagine conducting ASBI systematically hence contributing for patients having better health outcomes.	Education, Persuasion																
		5.3	Information about social and environmental consequences																		
16.2		Imaginary reward																			
Lack of opportunities for sharing experiences with other professionals	Organisational culture /climate Barriers and facilitators Group confirmity Social comparisons	6.2	Social comparisons	Inform participants about the SBI rates in each PHC unit. Group discussion on ASBI experiences. Presentation from an expert on alcohol addiction providing enough time for discussion and experience sharing	Education, Modelling, Persuasion																
		9.1	Credible source																		
Belief that BIs are complex and counselling is difficult	Perceived competence Perceived behavioural control Beliefs Professional confidence	4.1	Instruction on how to perform a behaviour	Participants observed and participated in ASBI training simulations. Prompt participants to practice ASBI at their workplaces. Ask participants to register the two main benefits for patients and for professionals, and the two main barriers for implementing ASBI; promote a group discussion around their answers, enlightening the benefits and use evidence for arguing against the barriers. Prompt participants to imagine and compare what would be the future health outcomes of implementing and not implementing BIs, and what would be the the gains of systematically delivering BIs. Discussion on ease of delivering a BI.	Education, Modeling, Persuasion, Training																
		6.1	Demonstration of the behaviour																		
		8.1	Behaviour practice/rehearsal																		
		8.3	Habit formation																		
		9.2	Pros and cons																		
		9.3	Comparative imagining of future outcomes																		
		15.1	Verbal persuasion about capability																		
16.2	Imaginary reward																				
Alcohol is not a priority; Professionals are too busy dealing with other problems	Knowledge Goal priority	5.1	Information about health consequences	Discussion on the severity of alcohol-related problems on the region participants are working and that alcohol-related problems were selected as health priority. Ask participants to assess the degree of regret they would feel if they do not implement ASBI (thus not helping patients to achieve the best health outcomes). Evidence that professionals approve a systematic approach to alcohol problems.	Education, Persuasion																
		5.3	Information about social and environmental consequences																		
		5.5	Anticipated regret																		

		Behaviour Change Techniques				CAPABILITY					OPPORTUNITY		MOTIVATION								
						Physical	Psychological				Social	Physical	Reflective						Automatic		
Barriers	Constructs	No.	Label	Intervention Content	Functions	S	K	S	MAD	BR	SI	EN	B Cap	B Cons	S/P ID	O	G	I	Reinf	EM	
		6.3	Information about others' approval	Suggest (using evidence) that implementing ASBI will help professionals to achieve other objectives: better control of hipertensive patients, better control of diabetic patients, and also that it will also help to achieve the goals contractualized with the PHC units																	
		13.2	Framing / reframing																		
Lack of screening and counselling materials	Resources/material resources	7.1	Prompts / cues	AUDIT screening tool, pens and patient handouts at the PHC professionals' desk;	Enablement, Environmental restructuring																
		12.5	Adding objects to the environment	Posters to display throughout PHC premisses																	
Difficult to remember to screen systematically	Memory	2.2	Feedback on behaviour	Periodically inform participants about the SBI rates in each PHC unit Participants observed and participated in ASBI training simulations. Prompt participants to practice ASBI at their workplaces. Advise to minimize time spent performing ASBI by adopting a teamwork model: the receptionist gives the AUDIT to the patient; the patient fills in the AUDIT while waiting for the appointment; if positive, BI can be delivered by the family physician or by the family nurse. AUDIT screening tool and patient handouts at the PHC professionals' desk. Posters to display throughout PHC premisses.	Education, Enablement, Environmental restructuring, Modeling, Persuasion, Training																
		4.1	Instruction on how to perform a behaviour																		
		6.1	Demonstration of the behaviour																		
		7.1	Prompts / cues																		
		8.1	Behaviour practice/rehearsal																		
		8.3	Habit formation																		
		12.2	Restructuring the social environment																		
		12.5	Adding objects to the environment																		
Alcohol SBI could damage doctor-patient relationship	Knowledge of task environment	6.3	Information about others' approval	Evidence that the majority of patients approve being asked about alcohol	Persuasion																
	Beliefs	4.4	Behavioural experiments	Prompt participants to practice ASBI at their workplaces and to note patients' reactions	Education, Enablement, Persuasion																
		5.3	Information about social and environmental consequences	Evidence that patients do not get upset when asked about alcohol use, are willing to answer the AUDIT questions and would like to be advised if alcohol was to harm them																	

Supplementary Material S2. Description of the first module of the training programme

	Objectives	Content	Methodology	Barriers addressed	Behaviour Change Techniques applied	Time (minutes)
Introduction	To present the training and support programme	Introduction	Expository method	Lack of support	Social support (unspecified)	30
	Introduction of trainers and participants		Active method: ice breaking activity	Lack of opportunities for sharing experiences with other professionals	Social comparisons	
	Expectations of the training and support programme					
	To understand the contribution of alcohol for the global disease burden	Global impact of alcohol consumption	Expository method	Lack of knowledge	Information about health consequences	10
	To be aware of alcohol as a substance causing harm to users and to others					
	To identify the differences between men and women concerning the metabolism of alcohol					
	To know the average annual consumption of alcohol in Portugal				Information about social and environmental consequences	
	To relate the average daily consumption to the lifetime risk of dieing from alcohol use					
	To relate the average daily consumption to the relative risk for alcohol-related diseases					
	Questions and partial summary		Interrogative method	---	---	
			Expository method			
	To know the national and local death rates for liver cirrhosis and transport accidents	Impact of alcohol consumption in the Health Region of Dão Lafões Primary care actions for reducing the impact of alcohol consumption	Expository method Active method: group discussion	Lack of knowledge	Information about health consequences	15
	To recognize alcohol as a major contributor for liver cirrhosis and transport accidents			Alcohol is not a priority	Information about social and environmental consequences	
	To realize that alcohol is a local health priority			Professionals' frustration and sense of low self-efficacy with unsuccessful attempts to counsel patients to cutdown	Antecipated regret	
	To recognize delivery of alcohol SBI as a preventive activity for primary care professionals			Preventive health should be patients' responsibility	Imaginary reward	
	To know the evidence supporting the efficacy/effectiveness of alcohol SBI			Alcohol SBI are not effective	Social comparisons	
	To realize that alcohol SBI is a cost-effective activity when delivered in primary care				Incompatible beliefs	
	Questions and partial summary		Interrogative method	---	---	
			Expository method			

	Objectives	Content	Methodology	Barriers addressed	Behaviour Change Techniques applied	Time (minutes)
Development	To know the definition of standard drink	Terminology	Expository method	Lack of knowledge	Information about health consequences	15
	To understand the consumption of alcohol as a risk continuum				Information about social and environmental consequences	
	To know the "recommended drinking limits" for men and women as defined on the national guideline		Interrogative method			
	To know the definition of low risk drinking, binge drinking, hazardous drinking, harmful drinking, and alcohol dependence					
	Questions and partial summary		Interrogative method	---	---	
			Expository method			
	To know that blood tests for diagnosing alcohol misuse have low sensitivity	Screening for alcohol	Expository method	Reliance on blood tests to diagnose alcohol misuse	Information about health consequences	35
	To recognize AUDIT as the recommend screening questionnaire by the national guideline				Information about social and environmental consequences	
	To get familiar with the AUDIT questions		Demonstrative method	Lack of knowledge	Instruction on how to perform a behaviour	
	To know how to score the AUDIT questions				Demonstration of the behaviour	
	To know how to classify the risk level in accordance with the AUDIT scoring					
	To know the proper action depending on the AUDIT scoring, as recommended by the national guideline					
	To watch a demonstration of how to apply the AUDIT					
	Questions and partial summary		Interrogative method	---	---	
			Expository method			
Coffee-break						
Development	To practice screening with the AUDIT	Screening with the AUDIT	Active method: clinical case discussion	Lack of training	Behaviour practice / rehearsal Habit formation	40
	Questions and partial summary		Interrogative method	---	---	
			Expository method			

Supplementary Material S2 (cont.). Description of the first module of the training programme

	Objectives	Content	Methodology	Barriers addressed	Behaviour Change Techniques applied	Time (minutes)			
	To understand simple advice as a simplified form of brief intervention	Simple advice	Expository method	Lack of knowledge	Instruction on how to perform a behaviour	80			
	To watch a demonstration of how to deliver simple advice		Demonstrative method	Lack of training	Demonstration of the behaviour				
	To practice delivering simple advice		Active method: role play	BIs are complex and counselling is difficult	Behaviour practice / rehearsal				
			Questions and partial summary	Interrogative method	BIs are complex and counselling is difficult		Habit formation		
				Expository method	Lack of time		Verbal persuasion about capability		
	Lunch-break								
	To know that primary care professionals support alcohol SBI		Expository method	Lack of motivation/willingness to engage with drinkers	Information about others' approval	50			
	To realize that primary care professionals believe that asking about alcohol is part of their job						Active method: group discussion	Preventive health should be patients' responsibility	Social comparisons
	To know that primary care professionals believe they deliver alcohol SBI regularly							Professionals think they screen frequently about alcohol	Incompatible beliefs
	To realize that alcohol SBI are seldomly delivered							Lack of opportunities for sharing experiences with other professionals	
To find reasons for the contradiction why primary care professionals believe alcohol SBI rates are high when they are actually quite low									

Supplementary Material S2 (cont.). Description of the first module of the training programme

	Objectives	Content	Methodology	Barriers addressed	Behaviour Change Techniques applied	Time (minutes)
	<p>To be aware of the benefits for the patients and for health professionals of implementing alcohol SBI</p> <p>To be aware of the barriers hindering the implementation of alcohol SBI and how to overcome them</p>	Barriers and facilitators	<p>Active method: group work</p> <p>Expository method</p>	<p>Patients' misbeliefs about alcohol</p> <p>Lack of structured action protocol</p> <p>Lack of screening and counselling materials</p> <p>Lack of support</p> <p>Professionals believe that alcohol SBI are not effective / patients will not follow the advice to cutdown</p> <p>Alcohol is not a priority</p> <p>Professionals are too busy dealing with other problems</p> <p>Lack of time</p> <p>Frustration and sense of low self-efficacy with unsuccessful cases</p> <p>Belief that BIs are complex and counselling is difficult</p> <p>Difficult to remember to screen systematically</p> <p>Alcohol SBI could damage doctor-patient relationship</p>	<p>'Instruction on how to perform a behaviour</p> <p>Adding objects to the environment</p> <p>Problem solving</p> <p>Action planning</p> <p>'Prompts / cues</p> <p>'Social support (unspecified)</p> <p>'Information about others' approval</p> <p>Framing / reframing</p> <p>'Imaginary reward</p> <p>Restructuring the social environment</p> <p>'Comparative imagining of future outcomes</p> <p>'Information about emotional consequences</p> <p>Focus on past success</p> <p>Habit formation</p>	150
Conclusion	To summarize the first training session	Final summary	Interrogative method	---	---	10
			Expository method			
		Conclusion	Expository method			

Supplementary Material S3. Description of the second module of the training programme

	Objectives	Content	Methodology	Barriers addressed	Behaviour Change Techniques applied	Time (minutes)
Introduction	To review the contents of the first training day	Introduction	Expository method	---	---	15
	To present the contents of the second training day		Interrogative method			
Development	To present the alcohol SBI rates in each PHC unit	Implementation efforts	Active method: group discussion Expository method	Lack of opportunities for sharing experiences with other professionals	Problem solving	90
	To allow participants to discuss implementation difficulties			Lack of training	Action planning	
				Lack of incentives	Feedback on behaviour	
				Lack of structured action protocol	Social comparisons	
				Lack of motivation/willingness to engage with drinkers	Social reward	
	To find solutions for the difficulties encountered			Difficult to remember to screen systematically	Verbal persuasion about capability	
	Coffee-break					
	To know the different types of brief interventions	Brief intervention Transtheoretical Model	Expository method Interrogative method Demonstrative method	Lack of knowledge	Instruction on how to perform a behaviour	120
	To understand the five major steps to a brief intervention: Ask, Advise, Assess, Assist, and Arrange			Lack of training	Demonstration of the behaviour	
	To know the Transtheoretical Model of behaviour change			Lack of structured action protocol	Habit formation	
To integrate the Transtheoretical Model into the brief intervention steps	Belief that BIs are complex and counselling is difficult			Graded tasks		
To understand how to tailor the approach to the patient taking into account the patient's stage of change						
Questions and partial summary		Interrogative method Expository method	---	---		
Lunch-break						
	To understand the principles of motivational		Expository method	Lack of knowledge Lack of training	Instruction on how to perform a behaviour Demonstration of the behaviour	

Supplementary Material S3 (cont.). Description of the second module of the training programme

	Objectives	Content	Methodology	Barriers addressed	Behaviour Change Techniques applied	Time (minutes)
	interviewing To know the major techniques of motivational interviewing (OARS skills) To learn how to use the OARS skills for helping patients changing their behaviour	Motivational Interviewing	Interrogative method Demonstrative method Active method: group work and role play	Lack of training Belief that BIs are complex and counselling is difficult Lack of time Lack of opportunities for sharing experiences with other professionals	Behaviour practice / rehearsal Habit formation Graded tasks Verbal persuasion about capability Social comparisons	200
Conclusion	To summarize the second training session	Final summary	Interrogative method Expository method	---	---	10
		Conclusion	Expository method			

	Objectives	Content	Methodology	Barriers addressed	Behaviour Change Techniques applied	Time (minutes)
Introduction	To review the contents of the first and second training days	Introduction	Expository method	---	---	15
	To present the contents of the third training day		Interrogative method			
Development	To improve the OARS skills	Brief Intervention Transtheoretical Model	Active method: group discussion	Lack of opportunities for sharing experiences with other professionals	Instruction on how to perform a behaviour	90
	To tailor the OARS skills to the stage of change of the patient		Expository method	Lack of knowledge	Demonstration of the behaviour	
			Interrogative method	Lack of training	Behaviour practice / rehearsal	
			Demonstrative method	Belief that BIs are complex and counselling is difficult	Habit formation	
				Professionals' frustration and sense of low self-efficacy with unsuccessful attempts to counsel patients to cutdown	Graded tasks	
				Information about emotional consequences		
				Social comparisons		
				Comparative imagining of future outcomes		
				Verbal persuasion about capability		
				Focus on past success		
	Questions and partial summary		Interrogative method	---	---	
			Expository method			
	Coffee-break					
Development				Lack of opportunities for sharing experiences with other professionals	Instruction on how to perform a behaviour	
					Demonstration of the behaviour	
					Behaviour practice / rehearsal	
					Habit formation	
					Graded tasks	

Supplementary Material S4 (cont.). Description of the third module of the training programme

	Objectives	Content	Methodology	Barriers addressed	Behaviour Change Techniques applied	Time (minutes)
	To improve the OARS skills	Brief Intervention Transtheoretical Model	Interrogative method	Lack of training Professionals' frustration and sense of low self-efficacy with unsuccessful attempts to counsel patients to cutdown Belief that BIs are complex and counselling is difficult	Graded tasks	120
	To tailor the OARS skills to the stage of change of the patient		Demonstrative method		Information about emotional consequences	
			Active method: group work, group discussion		Social comparisons	
					Social reward	
					Comparative imagining of future outcomes	
					Verbal persuasion about capability	
					Focus on past success	
	Questions and partial summary		Interrogative method	---	---	
			Expository method			
	Lunch-break					
	To understand the concept of alcohol dependence	Alcohol dependence	Expository method	Lack of knowledge	Information about health consequences	200
	To know how to diagnose alcohol dependence		Interrogative method	Lack of training	Information about social and environmental consequences	
			Demonstrative method	Reliance on blood tests to diagnose alcohol misuse		
	To understand the principles for treating alcohol dependence		Active method: group discussion	Lack of support services	Social support (unspecified)	
				Lack of opportunities for sharing experiences with other professionals	Credible source	
Conclusion	To summarize the third training session	Final summary	Interrogative method	---	---	10
			Expository method			
		Conclusion	Expository method			

Supplementary Material S5. Description of the fourth module of the training programme

	Objectives	Content	Methodology	Barriers addressed	Behaviour Change Techniques applied	Time (minutes)
Introduction	To review the contents of the previous three training days	Introduction	Expository method	---	---	15
	To present the contents of the fourth training day		Interrogative method			
Development	To improve the OARS skills	Brief Intervention Transtheoretical Model	Active method: group discussion of a video	Lack of opportunities for sharing experiences with other professionals Lack of knowledge Lack of training	Instruction on how to perform a behaviour Demonstration of the behaviour Habit formation Graded tasks Social comparisons	90
	To tailor the OARS skills to the stage of change of the patient					
	Questions and partial summary					
	Coffee-break					
				Lack of opportunities for sharing experiences with other professionals	Instruction on how to perform a behaviour	

	Objectives	Content	Methodology	Barriers addressed	Behaviour Change Techniques applied	Time (minutes)
	To improve the OARS skills	Brief Intervention Transtheoretical Model	Interrogative method	Lack of knowledge	Demonstration of the behaviour	120
	To tailor the OARS skills to the stage of change of the patient		Active method: group work, group discussion	Lack of training	Behaviour practice / rehearsal	
				Belief that BIs are complex and counselling is difficult	Habit formation	
					Graded tasks	
	Questions and partial summary		Interrogative method	---	---	
	Lunch-break					
	To practice alcohol screening and brief interventions	Screening Brief interventions	Active method: group work, role play	Lack of training Lack of time Lack of opportunities for sharing experiences with other professionals	Behaviour practice / rehearsal Habit formation Graded tasks Social comparisons Verbal persuasion about capability	200
Conclusion	To summarize the training course	Final summary	Interrogative method	---	---	10
			Expository method			
		Conclusion	Expository method			